

REMARKS

This application has been amended. Particularly, claim 5 has been amended to incorporate language similar to that previously appearing in claims 8 and 10. Further support can be found in the paragraph beginning at the bottom of page 7 of the application as filed. Support for the amendment to claim 6 can be found in the first full paragraph of page 3 of the application as filed. Claims 7 and 9 have been amended for clarity. In addition, claims 15 and 16 have been added. Support for claims 15 and 16 can be found in the previous version of claim 5. Thus, no new matter has been added. Claims 8 and 10 have been cancelled and claims 11-14 were previously withdrawn. Claims 5-7, 9 and 15-16 are now subject to examination on the merits.

Claims 5-10 stand rejected under 35 U.S.C. 103(a) for obviousness over Becerra et al. (US 2005/0014041) in view of Aoyagi et al. (US 6,670,063) and Yamada (JP 2001-069614). In view of the foregoing amendments and following remarks, Applicant respectfully traverses this rejection.

Becerra is directed to a system for managing a fuel cell system which includes a fuel cell, a detachable fuel canister and a backup battery. If the fuel cell runs out of fuel, a replenishment control system connects the load to the backup battery until more fuel can be supplied. Once the empty fuel canister is removed and is replaced with a new fuel canister, the system resumes normal operation.

Aoyagi is directed to a fuel cell system comprising a fuel cell and a rechargeable battery. The system includes a sensor for measuring the output current of the fuel cell as well as a sensor for measuring the state of charge and output current of the battery. This information is fed to a central controller which regulates the amount of fuel provided to the fuel cell. If the current supplied by the fuel cell is insufficient to power the load, current from the battery is used to supplement the fuel cell output. In addition, the system ensures that the battery is never overcharged.

Yamada is directed to a motor which uses two power sources—a fuel cell and a battery. The control system of the motor calculates the power remaining in the fuel cell and battery, and when the residual power remaining is below a predetermined level, an alarm is displayed, signaling that the appropriate fuel supplement, such as a battery charge, should be performed.

Claim 5 is directed to a fuel cell system having a fuel cell and a secondary

battery as a backup supply. The system includes means for monitoring an output of the fuel cell and, when the output of the fuel cell decreases to at or below a predetermined value, the secondary battery is connected to the load. The system further includes means for disconnecting the load from the secondary battery when the capacity remaining in the secondary battery becomes less than or equal to a certain level. The capacity remaining in the secondary battery when it is disconnected from the load is sufficient to restart the fuel cell. This feature allows for the fuel cell system to be restarted using the battery power after the fuel supply is restored to the fuel cell.

None of the cited documents of record disclose a means for disconnecting the secondary (backup) battery from the load so that the capacity remaining in the secondary battery is greater than that which is necessary to restart the fuel cell. In Becerra, the means for controlling the secondary battery is limited to engaging the secondary battery when there is insufficient power provided by the fuel cell. (Becerra, ¶¶ 42, 72). Presumably, the battery is disconnected from the load once a new fuel canister is supplied. If no new canister is supplied, it is possible that the backup battery will drain to the point where no capacity remains. Thus, the means for connecting or disconnecting the battery from the load is dependent only on the availability of power from the fuel cell and is not based on the remaining capacity of the battery itself. Accordingly, Becerra fails to disclose, teach or suggest a means for disconnecting the battery from the load while the capacity remaining in the secondary battery is greater than that which is necessary to restart the fuel cell.

Reference to Aoyagi does not cure this deficiency of Becerra. While, in Aoyagi, the battery capacity is monitored and the battery power utilized is dependent on the load demand and the power supply of the fuel cell. Aoyagi does not teach or disclose a means for disconnecting the battery from the load, much less means for disconnecting the battery from the load while the capacity remaining in the battery is greater than the level required to restart the fuel cell. The Examiner contends that it would be obvious in view of Aoyagi to use the fuel cell (rather than the battery) to provide power to the load when the battery capacity is low to prevent over discharging of the battery. (Office Action, page 5). However, even assuming this is correct, the proposed switch from battery power to fuel cell power is dependent on the availability of a fuel supply, not on the remaining capacity of the battery. If no new fuel supply is available, the battery in Aoyagi would eventually completely discharge, absent a teaching to the contrary. There is nothing in Aoyagi that would teach or

suggest disconnecting the battery from the load, or, more particularly, disconnecting the battery from the load while the remaining battery capacity is above that required to restart the fuel cell. Thus, Aoyagi fails to cure the deficiency of Becerra with respect to claim 5, discussed above.

Yamada is cited as allegedly teaching an alarm system that is displayed when the remaining capacity of a backup battery and the fuel cell capacity are below a predetermined level. Yamada does not teach or suggest a means for disconnecting the secondary battery from the load, much less a means for disconnecting the battery from the load when the remaining capacity of the battery is as described in claim 5. Thus, Yamada does not cure the deficiency of Becerra discussed above.

Claim 5 is directed to a fuel cell system having a fuel cell and a secondary battery as a backup supply that includes a means for monitoring an output of the fuel cell and a means for disconnecting the load from the secondary battery when the capacity remaining in the secondary battery becomes less than or equal to a certain level. As explained above, such a fuel cell system is not taught in or obvious in view of the cited documents of record, whether considered alone or in combination. Thus, it is respectfully submitted that the outstanding rejection under 35 U.S.C. 103(a) should be reconsidered and withdrawn.

For all the foregoing reasons, Applicant submits that the pending claims are patentable over the cited documents of record and are in condition for allowance. Accordingly, reconsideration of the outstanding rejections and allowance of claims 5-7, 9 and 15-16 are respectfully requested.

Respectfully submitted,

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